

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号  
特開2001-168488  
(P2001-168488A)

(43) 公開日 平成13年6月22日 (2001.6.22)

(51) Int.Cl.<sup>7</sup>  
H 0 5 K 1/11

識別記号

F I  
H 0 5 K 1/11

テ-マ-ト (参考)  
C 5 E 3 1 7

審査請求 未請求 請求項の数 4 O L (全 4 頁)

(21) 出願番号 特願平11-352957

(22) 出願日 平成11年12月13日 (1999. 12. 13)

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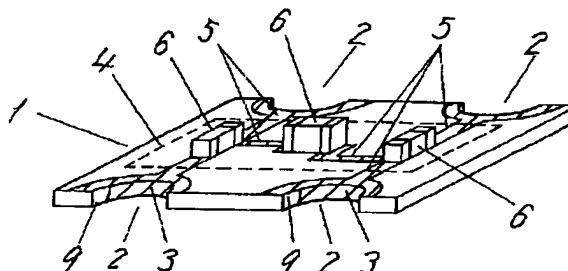
(54) 【発明の名称】 表面実装型電子部品及びこれを実装した実装体

(57) 【要約】

【課題】 本発明は、通信機器などに用いられる表面実装型電子部品及びこれを実装した実装体に関するものであって、表面実装型電子部品を実装した実装体の軽量化を目的とする。

【解決手段】 基板 1 の切り欠き部 2 表面に設けられた側面電極 3 に、切り欠き部 2 の表面が露出した非電極形成部 9 を設けた。

- 1 基板
- 2 切り欠き部
- 3 側面電極
- 4 回路構成部
- 9 非電極形成部



## 【特許請求の範囲】

【請求項1】 基板と、この基板の上面に設けられた回路構成部と、前記基板の下面に設けられた端子電極と、前記基板の側面に設けた切り欠き部と、この切り欠き部の表面に設けられるとともに前記回路構成部と端子電極とを接続した側面電極とを備え、前記側面電極には前記基板表面が露出した非電極形成部を設けたことを特徴とする表面実装型電子部品。

【請求項2】 非電極形成部を側面電極の両端部分に設けたことを特徴とする請求項1に記載の表面実装型電子部品。

【請求項3】 非電極形成部の幅を基板の下面側より上面側を広くしたことを特徴とする請求項1または請求項2に記載の表面実装型電子部品。

【請求項4】 回路基板上に表面実装型電子部品を実装した実装体において、前記表面実装型電子部品は、基板と、この基板の上面に設けられた回路構成部と、前記基板の下面に設けられた端子電極と、前記基板の側面に設けた切り欠き部と、この切り欠き部の表面に設けられるとともに前記回路構成部と端子電極とを接続する側面電極とを備え、前記側面電極には前記基板表面が露出した非電極形成部を設けたことを特徴とする実装体。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、通信機器などに用いられる表面実装型電子部品及びこれを実装した実装体に関するものである。

## 【0002】

【従来の技術】一般に、基板上に回路構成部を有する表面実装型電子部品は、図4に示すごとく、基板1の側面に設けられた切り欠き部2の表面に形成された側面電極3を介して、破線で示す基板1の上面に設けられた回路構成部4と基板1の下面側に設けられた外部接続用の端子電極（図示せず）とを接続した構成となっていた。

【0003】また、この側面電極3は、切り欠き部2の表面全体に設けられていた。

## 【0004】

【発明が解決しようとする課題】このような表面実装型電子部品を外部の回路基板上にリフロー実装する場合、回路基板に半田付けされる側面電極3部分に所定の半田フィレットが要求される。

【0005】しかしながら、従来のものでは、その側面電極3が切り欠き部2の表面全体に設けられていたの、リフロー実装用のクリーム半田が側面電極3の表面全体に回り込んでしまい、側面電極3に所定の半田フィレットを形成するためには多量のクリーム半田を使用しなければならず、この結果として表面実装型電子部品を実装した実装体の重量が大きくなってしまいう問題があった。

【0006】そこで、本発明は表面実装型電子部品を実

装した実装体を軽量化することを目的とするものである。

## 【0007】

【課題を解決するための手段】そして、この目的を達成するために本発明は、基板の切り欠き部表面に設けられた側面電極に基板表面が露出した非電極形成部を設けたものである。

## 【0008】

【発明の実施の形態】本発明の請求項1に記載の発明は、基板と、この基板の上面に設けられた回路構成部と、前記基板の下面に設けられた端子電極と、前記基板の側面に設けた切り欠き部と、この切り欠き部の表面に設けられるとともに前記回路構成部と端子電極とを接続した側面電極とを備え、前記側面電極には前記基板表面が露出した非電極形成部を設けたことを特徴とする表面実装型電子部品であって、切り欠き部内における側面電極の面積を小さくすることで、少量のクリーム半田で所定の半田フィレットを形成でき、軽量化が図れる。

【0009】請求項2に記載の発明は、非電極形成部を側面電極の両端部分に設けたことを特徴とする請求項1に記載の表面実装型電子部品であって、より少量のクリーム半田で効率良く半田フィレットを形成できる。

【0010】請求項3に記載の発明は、非電極形成部の幅を基板の下面側より上面側を広くしたことを特徴とする請求項1または請求項2に記載の表面実装型電子部品であって、表面実装型電子部品の実装信頼性を高めることが出来る。

【0011】請求項4に記載の発明は、回路基板上に表面実装型電子部品を実装した実装体において、前記表面実装型電子部品は、基板と、この基板の上面に設けられた回路構成部と、前記基板の下面に設けられた端子電極と、前記基板の側面に設けた切り欠き部と、この切り欠き部の表面に設けられるとともに前記回路構成部と端子電極とを接続した側面電極とを備え、前記側面電極には前記基板表面が露出した非電極形成部を設けたことを特徴とする実装体であって、請求項1に記載の発明と同等の効果を得ることができる。

【0012】以下、本発明の一実施形態について図を用いて説明する。なお、前述した従来の技術と同様の構成については同じ符号を付すものとする。

【0013】図1は、表面実装型電子部品の斜視図である。

【0014】この表面実装型電子部品は、ガラスエポキシ樹脂等からなる基板1の上面側に、回路電極5及びチップ部品6が設けられて破線で囲む回路構成部4が形成され、基板1の下面側に図2に示すようにこの回路構成部4を外部の回路基板7に接続する端子電極8が設けられている。

【0015】図1に戻り、基板1の側面には半円状の切り欠き部2が4箇所設けられており、その表面には、回

路電極５と端子電極８を接続する側面電極３が設けられている。

【００１６】そして、切り欠き部２の表面には、側面電極３と、基板１の一部が露出した非電極形成部９とが設けられた構成となっている。

【００１７】このような構成としたことで、切り欠き部２の表面積に対して側面電極３の面積が小さくなるので、図２に示す如くクリーム半田１０が切り欠き部２の表面全体に回り込まず側面電極３部分に集中するので、少量のクリーム半田１０でも所定の半田フィレットが形成でき、軽量化が図れるのである。

【００１８】また、非電極形成部９は、切り欠き部２の両端部分にそれぞれ設けられており、切り欠き部２内において一つの側面電極３として設けられた状態となっている。これにより、側面電極３が切り欠き部２内で分割されず、切り欠き部２の中央部分に配置されるので、側面電極３に於けるクリーム半田１０の回り込みがさらに良くなるのである。

【００１９】さらに、非電極形成部９の形状は、基板１の下面側の幅ａより上面側の幅ｂを広くするように設けられている。これにより、側面電極３は基板１の上面側が狭く、基板１の下面側が広くなり、このような側面電極３に対して形成される半田フィレットの形状は、側面電極３の上側から下側に向けて広がるように形成され、表面実装型電子部品の実装信頼性を高いものと出来るのである。

【００２０】さらにまた、側面電極３の面積を調節する、つまり非電極形成部９の割合を調節することで、半田フィレットの形状を自在に調節できるのである。

【００２１】また、このような側面電極３を形成する場合、図３に示す如く複数の基板１が整列配置した集合基板１１に、所定の電極パターン１２を形成し、破線で示すスルーホール１３部分を含んだ位置で切断する方法が

一般であるが、前述したように側面電極３で形成される切り欠き部２の両端部分に非電極形成部９を形成することで、スルーホール１３の切断位置が非電極形成部９部分となるので、切断による電極バリが発生せず、電極バリの除去工程が省けるものとなる。

【００２２】また、集合基板１１に対する切断ズレが発生しても、非電極形成部９の範囲内であれば、所定の側面電極３が得られるので、側面電極３による積層型電子部品の特性への影響を防止できるのである。

【００２３】なお、本一実施形態では切り欠き部２の形状を半円状としたが、半楕円状、三角状等の任意の形状としても何ら効果は変わらないものである。

【００２４】

【発明の効果】以上のように本発明によれば、側面電極部分に基板表面が露出した非電極形成部を設けた構成としたので、側面電極の面積を小さくすることができ、少量のクリーム半田でも効率よく半田フィレットを形成でき、軽量化が図れるのである。

【図面の簡単な説明】

【図１】本発明の一実施形態における表面実装型電子部品の斜視図

【図２】同表面実装型電子部品における半田フィレットの状態を示す断面図

【図３】同表面実装型電子部品に用いられる基板の製造方法を示す斜視図

【図４】従来の表面実装型電子部品の斜視図

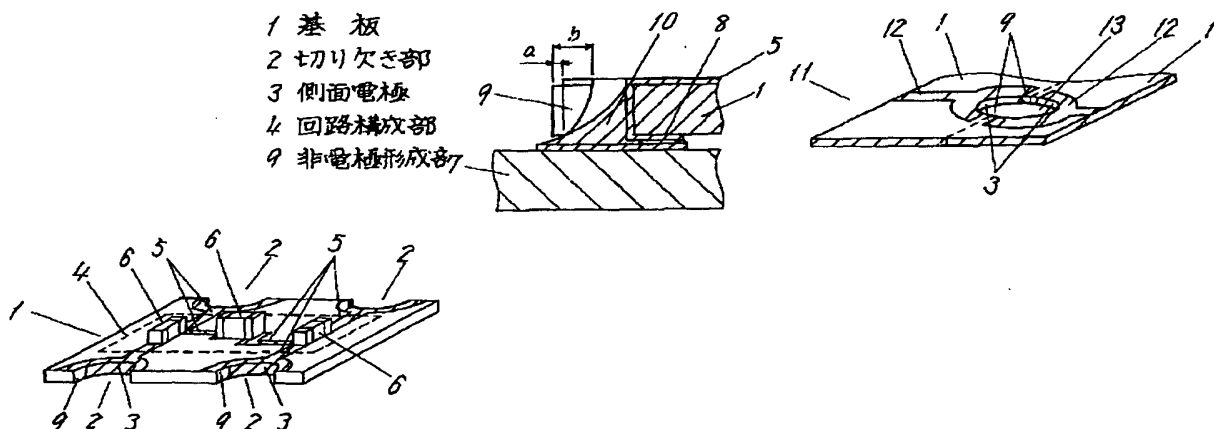
【符号の説明】

- １ 基板
- ２ 切り欠き部
- ３ 側面電極
- ４ 回路構成部
- ５ 非電極形成部
- ６
- ７
- ８
- ９
- １０
- １１
- １２
- １３

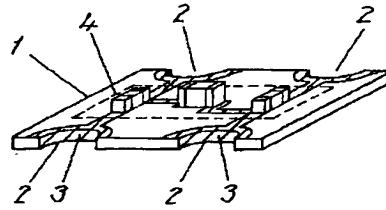
【図１】

【図２】

【図３】



【図4】



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Fターム(参考) 5E317 AA04 AA22 AA25 AA28 GG17

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-168488

(43)Date of publication of application : 22.06.2001

(51)Int.Cl.

H05K 1/11

(21)Application number : 11-352957

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(22)Date of filing : 13.12.1999

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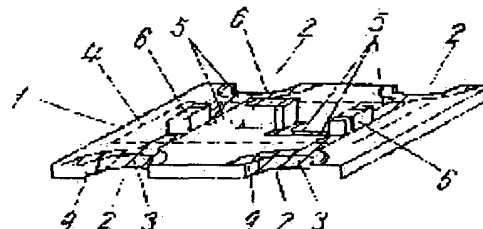
## (54) SURFACE-MOUNTING ELECTRONIC COMPONENT AND PACKAGING BODY MOUNTING THEM

## (57)Abstract:

PROBLEM TO BE SOLVED: To reduce the weight of a packaging body, where surface-mounting electronic components are mounted, where the electronic components are used for communication equipment or the like and the packaging body mounts the electronic components.

SOLUTION: A non-electrode formation part 9, where the surface of a cutout 2 is exposed is provided at a side electrode 3 which is provided on the surface of the cutout 2 of a substrate 1.

- 1 基板
- 2 切り欠き部
- 3 側面電極
- 4 回路構成部
- 5 非電極形成部



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's]

decision of rejection]

[Date of extinction of right]

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**CLAIMS**

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[Claim(s)]

[Claim 1] The surface mount type electronic parts which are equipped with a substrate, the circuitry section prepared in the upper surface of this substrate, the terminal electrode prepared in the inferior surface of tongue of the aforementioned substrate, the notching section which prepared in the side of the aforementioned substrate, and the side electrode which connected the aforementioned circuitry section and a terminal electrode while being prepared in the front face of this notching section, and are characterized by to prepare the non-electrode formation section which the aforementioned substrate front face exposed to the aforementioned side electrode.

[Claim 2] Surface mount type electronic parts according to claim 1 characterized by preparing the non-electrode formation section in a part for the both ends of a side electrode.

[Claim 3] Surface mount type electronic parts according to claim 1 or 2 characterized by making an upper surface side larger than the inferior-surface-of-tongue side of a substrate for the width of face of the non-electrode formation section.

[Claim 4] The mounting object which is characterized by providing the following and which mounted surface mount type electronic parts on the circuit board. The aforementioned surface mount type electronic parts are substrates. The circuitry section prepared in the upper surface of this substrate. The terminal electrode prepared in the inferior surface of tongue of the aforementioned substrate. The non-electrode formation section which was equipped with the notching section prepared in the side of the aforementioned substrate, and the side electrode which connects the aforementioned circuitry section and a terminal electrode while being prepared in the front face of this notching section, and the aforementioned substrate front face exposed to the aforementioned side electrode.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the mounting object which mounted the surface mount type electronic parts and this which are used for communication equipment etc.

[0002]

[Description of the Prior Art] general -- a substrate -- a top -- circuitry -- the section -- having -- a surface mount -- type -- electronic parts -- drawing 4 -- being shown -- as -- a substrate -- one -- the side -- preparing -- having had -- notching -- the section -- two -- a front face -- forming -- having had -- the side -- an electrode -- three -- minding -- a dashed line -- being shown -- a substrate -- one -- the upper surface -- preparing -- having had -- circuitry -- the section -- four -- a substrate -- one -- an inferior surface of tongue

[0003] Moreover, this side electrode 3 was formed in the whole front face of the notching section 2.

[0004]

[Problem(s) to be Solved by the Invention] When carrying out reflow mounting of such surface mount type electronic parts on the external circuit board, a predetermined solder fillet is required of side electrode 3 portion soldered to the circuit board.

[0005] However, in the conventional thing, since the side electrode 3 was formed in the whole front face of the notching section 2 The cream solder for reflow mounting turns to the whole front face of the side electrode 3. In order to form a predetermined solder fillet in the side electrode 3, a lot of cream solder had to be used, and there was a problem that the weight of the mounting object which mounted surface mount type electronic parts as this result will become large.

[0006] Then, this invention aims at lightweight-izing the mounting object which mounted surface mount type electronic parts.

[0007]

[Means for Solving the Problem] And in order to attain this purpose, this invention prepares the non-electrode formation section which the substrate front face exposed to the side electrode prepared in the notching section front face of a substrate.

[0008]

[Embodiments of the Invention] The circuitry section by which invention of this invention according to claim 1 was prepared in the upper surface of a substrate and this substrate, The terminal electrode prepared in the inferior surface of tongue of the aforementioned substrate, and the notching section prepared in the side of the aforementioned substrate, It has the side electrode which connected the aforementioned circuitry section and the terminal electrode while being prepared in the front face of this notching section. It is the surface mount type electronic parts characterized by preparing the non-electrode formation section which the aforementioned substrate front face exposed to the aforementioned side electrode, and by making small area of a side electrode notching on the staff, a solder fillet predetermined with a small amount of cream solder can be formed, and lightweight-ization can be attained.



[0009] Invention according to claim 2 is surface mount type electronic parts according to claim 1 characterized by preparing the non-electrode formation section in a part for the both ends of a side electrode, and can form a solder fillet efficiently with a small amount of cream solder.

[0010] Invention according to claim 3 is surface mount type electronic parts according to claim 1 or 2 characterized by making an upper surface side larger than the undersurface side of a substrate for the width of face of the non-electrode formation section, and can raise the mounting reliability of surface mount type electronic parts.

[0011] In the mounting object with which invention according to claim 4 mounted surface mount type electronic parts on the circuit board the aforementioned surface mount type electronic parts A substrate, the circuitry section prepared in the upper surface of this substrate, and the terminal electrode prepared in the undersurface of the aforementioned substrate, It has the notching section prepared in the side of the aforementioned substrate, and the side electrode which connected the aforementioned circuitry section and the terminal electrode while being prepared in the front face of this notching section. It is the mounting object characterized by preparing the non-electrode formation section which the aforementioned substrate front face exposed to the aforementioned side electrode, and an effect equivalent to invention according to claim 1 can be acquired.

[0012] Hereafter, 1 operation form of this invention is explained using drawing. In addition, the same sign shall be attached about the same composition as the Prior art mentioned above.

[0013] Drawing 1 is the perspective diagram of surface mount type electronic parts.

[0014] The circuitry section 4 which the circuit electrode 5 and a chip 6 are formed in the upper surface side of the substrate 1 which these surface mount type electronic parts become from a glass epoxy resin etc., and is surrounded with a dashed line is formed, and the terminal electrode 8 which connects this circuitry section 4 to the external circuit board 7 at the undersurface side of a substrate 1 as shown in drawing 2 is formed.

[0015] It returns to drawing 1 , the four semicircle-like notching sections 2 are formed in the side of a substrate 1, and the side electrode 3 which connects the circuit electrode 5 and the terminal electrode 8 is formed in the front face.

[0016] And it has the composition that the side electrode 3 and the non-electrode formation section 9 which a part of substrate 1 exposed were formed in the front face of the notching section 2.

[0017] By having considered as such composition, since the cream solder 10 does not turn to the whole front face of the notching section 2 and focuses on side electrode 3 portion as it is shown in drawing 2 , since the area of the side electrode 3 becomes small to the surface area of the notching section 2, a small amount of cream solder 10 can also form a predetermined solder fillet, and lightweight-ization can be attained.

[0018] Moreover, the non-electrode formation section 9 is formed in a part for the both ends of the notching section 2, respectively, and is in the state where it was prepared as one side electrode 3 in the notching section 2. Since the side electrode 3 is not divided within the notching section 2 but is arranged by this at a part for the center section of the notching section 2, the wraparound of the cream solder 10 in the side electrode 3 becomes still better.

[0019] Furthermore, the configuration of the non-electrode formation section 9 is established so that it may become large about the width of face b by the side of the upper surface from the width of face a by the side of the undersurface of a substrate 1. Thereby, the side electrode 3 has the narrow upper surface side of a substrate 1, the configuration of the solder fillet formed to such a side electrode 3 is formed so that it may spread towards the bottom from the side electrode 3 bottom, and the undersurface side of a substrate 1 becomes large and it can do mounting reliability of surface mount type electronic parts with a high thing.

[0020] The area of the side electrode 3 is adjusted, that is, the configuration of a solder fillet can be adjusted free by adjusting the rate of the non-electrode formation section 9 further again.

[0021] Moreover, although the method of cutting in the position containing through hole 13 portion which forms the predetermined electrode pattern 12 in the set substrate 11 in which two or more substrates 1 carried out alignment arrangement as shown in drawing 3 , and is shown with a dashed line is general when forming such a side electrode 3 By forming the non-electrode

formation section 9 in a part for the both ends of the notching section 2 formed by the side electrode 3 as mentioned above, since the cutting position of a through hole 13 serves as non-electrode formation section 9 portion, the electrode barricade by cutting does not occur but the removal process of an electrode barricade can be skipped.

[0022] Moreover, since the predetermined side electrode 3 will be obtained if it is within the limits of the non-electrode formation section 9 even if the cutting gap to the set substrate 11 occurs, the influence of the property on the laminating type electronic parts by the side electrode 3 can be prevented.

[0023] In addition, although the configuration of the notching section 2 was made into the shape of a semicircle with this 1 operation form, an effect does not change at all as arbitrary configurations, such as the shape of the shape of a half-ellipse, and a triangle.

[0024]

[Effect of the Invention] Since it considered as the composition which prepared the non-electrode formation section which the substrate front face exposed to side electrode section as mentioned above according to this invention, area of a side electrode can be made small, a small amount of cream solder can also form a solder fillet efficiently, and lightweight-ization can be attained.

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[Translation done.]

**\* NOTICES \***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] The perspective diagram of the surface mount type electronic parts in 1 operation gestalt of this invention

[Drawing 2] The cross section showing the state of the solder fillet in the said surface mount type electronic parts

[Drawing 3] The perspective diagram showing the manufacture method of the substrate used for the said surface mount type electronic parts

[Drawing 4] The perspective diagram of the conventional surface mount type electronic parts

[Description of Notations]

- 1 Substrate
- 2 Notching Section
- 3 Side Electrode
- 4 Circuitry Section
- 9 Non-Electrode Formation Section

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[Translation done.]

## \* NOTICES \*

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

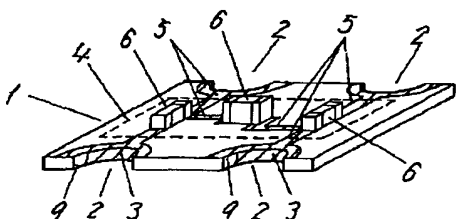
2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

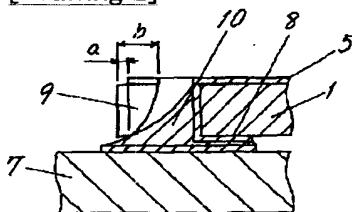
## DRAWINGS

[Drawing 1]

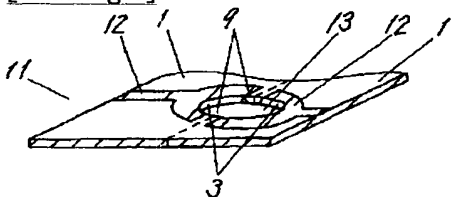
- 1 基板
- 2 切り欠き部
- 3 側面電極
- 4 回路構成部
- 9 非電極形成部



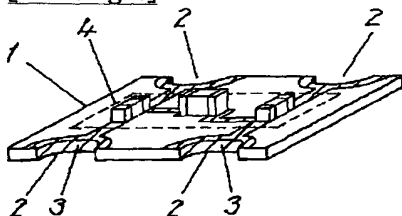
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]